LAY OUT AND EQUIPMENT OF PLAYGROUNDS

Layout and Equipment of Playgrounds

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IN preparing this handbook on the layout and equipment of playgrounds, the Playground and Recreation Association of America has attempted to bring together the information which has been issued in pamphlets and other publications, and to make it available for ready use in one handbook.

Stressing the subject of equipment in this manner in no way minimizes the importance of leadership. Apparatus does not comprise a playground; without leadership, equipment is worse than useless. When properly used, however, it stimulates desirable motor activities, and provides channels for play which are exceedingly valuable. For this reason, it is worthy of careful consideration.

CHAPTER I

General Considerations

SOME of the factors having to do with the laying out and equipping of a playground are as follows:

Location

In planning the location of a playground the question of the future development of the neighborhood—whether industrial or residential—should be considered. The sections in which there is the most distinct need should be determined and also the locations which can be most easily reached by the greatest number of children who should be served by playgrounds. They should, many feel, be provided within a quarter-mile radius of the homes of the younger children. Children from six to twelve will go as far as half a mile to the playground.

Size

The size of the playground is usually determined by the amount of land available, the cost, and the number of children to be accommodated. For two hundred and fifty children under ten years of age, half an acre will do, if no more space is available—

but two acres is much more desirable, and the usual grounds vary between these two limits. Some people feel that to have three hundred children playing at the same time on one acre, allowing one hundred forty square feet per child—a space about twelve feet square—represents a point of saturation.

Many communities attempt to secure numerous grounds for little children—that is, one in each neighborhood, sometimes in connection with schools.

For children over ten years of age the grounds need not be so numerous, but must be larger. From two to four acres is the minimum, especially if baseball is to be played, and ten to twenty-acre grounds, such as are found in the park systems of Chicago are most desirable.

Fencing of Grounds

Fencing, in the majority of cases, is felt to be a necessity. It limits liability for accidents since under the ruling of most courts if the gates are locked, authorities are not held responsible. It reduces problems of discipline and safeguards the ground and apparatus. It also gives individuality to the playground. There are a number of different kinds of fences which may advantageously be provided—the steel picket fence with steel posts set in concrete; the woven-wire fence with reinforced concrete or wooden posts and a top and bottom rail measuring from six to eight feet in length between posts, and the evergreen hedge of privet and box shrubs. Play-

ground fences average between four and eight feet in height. The appearance of any fence will be greatly improved if it is covered with honeysuckle, flowering vines or rambler roses.

Surfacing

The problem of surfacing is one which causes a great deal of difficulty and gives rise to much discussion. No surfacing has as yet been devised which has proved itself to be ideal or which is satisfactory for every ground. Soil conditions in the various parts of the country are important factors in determining what the surface must be, and there is no guarantee whatever that a process which has been successful in one city will prove satisfactory in another section of the country.

In planning surfacing the following points must be considered: suitability for use, cost, durability and maintenance. Playground surfacing should be soft and porous, yet firm enough for players to run and romp about on without digging holes in it when it is wet, and raising clouds of dust when it is dry.

The grading of a playground field will depend upon a specific problem. If the field is going to be used in the winter time, the field should be what is known as a depressed field with a low point in the center of the field and with a number of catch basins to catch the water, these catch basins, of course, being connected with sewers or drain pipes. The pitch or grade should not be less than six inches for

every hundred feet. In some play fields the problems involved may make it more advantageous to have the center of the field the high point and the fall toward the outside of the play field. With a grade of this kind, the field can scarcely be used for skating purposes, for there will be difficulty in flooding such a field.

Very frequently play fields become soft and muddy and continue for some few days in this condition because of inadequate and sluggish drainage. Water from rainfall must not stand on the play fields for any length of time, and therefore adequate drainage is imperative. The drain pipe leading away from the catch basins should never be smaller than six inches and very frequently should be eight or ten.

Grass makes the most desirable surfacing for children's play, but oftentimes it is not practicable. Various types of early and late maturing grasses have been combined for golf courses, terraces and much-used lawn surfacing by horticulturists. By mixing grasses of various length roots a deep turf is formed and the grasses coming to full foliage in rotation keep the sward green throughout the season. A list of grass seed dealers may be secured by writing to the Playground and Recreation Association of America, 1 Madison Avenue, New York City.

Sometimes oil has been used in an attempt to produce a satisfactory surface. Cinder has also been tried but is not generally recommended. Sandy

loam or a mixture of sand and clay makes a satisfactory surface in some sections. This requires sprinkling with water in dry weather.

The types of surfacing so far found most successful in Philadelphia and Chicago are quoted below:

In Philadelphia "the entire plot, with such exceptions as were required in each individual case, was graded to a sub-grade of ten inches below the finished grade. The surface so made was carefully, although not accurately, leveled and compacted by rolling with a steam-roller of not less than five tons in weight. After the soil or waste material resulting from this grading was disposed of, sufficient cinders were spread over the surface to insure, when rolled with a heavy roller, a thickness of seven inches. The cinders were thoroughly wet before and during the rolling process. It was found that the rolling could be done in one layer. To this surface a layer of stone screenings was added, which, having been rolled and brought to the surface to the grades given by the surveyor, had a thickness of three inches. As in the case of the cinders, the stone screenings must be thoroughly wet before and during rolling. This plan, recently adopted by the Philadelphia authorities, will eliminate the use on the playground surfaces of glutrin, tasscoil or similar artificial dressings as dust-layers, and will rely on a system of sprinkling with water to lay the dust. In order to make this method of dust-laying effective the playgrounds are piped and arrangements made so that sprinkling may be done whenever necessary."

In Chicago excavation was carefully made with reference to character of subsoil in an effort to secure good drainage. If subsoil of sticky clay was discovered, cinders twelve inches deep were first applied to the excavated surface. If a sandy subsoil was discovered, cinders to the depth of only four inches were needed. The cinders were then rolled and packed. Upon the well-rolled cinders was placed a layer of stone two inches deep, the stones measuring from one-half to one and one-quarter inches in diameter. The stone, like the cinders, was then well rolled.

Upon the stone was placed a layer of yellow clay with a sufficient sand content—about 33 per cent—to rub off somewhat easily when thoroughly dry; this was then rolled to a depth of about two inches and torpedo sand spread over the top. Torpedo sand is a name for crushed granite screenings which have passed through screens to a size of one-sixteenth to one-eighth inch, or fine gravel the same size.

Because of their expense, these types of surfacing may not be practicable for all communities. The method given below, however, is described by one authority as being within the reach of any average city.

If the sub-grade is handled giving the pitch desired for the finished grade, and six inches of cinders spread over the entire surface, a very porous upper surface will result, which in itself will seek to draw moisture from the upper surface. These cinders should be rolled with a roller of not less than

five tons. This layer of cinders should be covered with a three or four-inch layer of clay loam; it is usually possible to find this particular loam in every section. It has more sand than clay in its composition; it somewhat resembles molders' sand. On top of this can be spread perhaps a quarter of an inch of screened torpedo sand. In the initial construction of the field, an adequate amount of loam is very essential. This surface may be treated with oil or calcium chloride if desired. It must be borne in mind, however, that if lime is used, calcium chloride cannot be used; either the oil or calcium chloride acts as a binder, but more particularly a dust layer. This top dressing of screened torpedo sand is something which must be handled as a part of the maintenance, adding a part every now and then, depending upon the amount of play on the field. If it is impossible to go to the expense of sub-grading and covering the field with six inches of cinders, grading alone with the proper treatment of screened torpedo sand will give a good surface for a playground if the ground is of the right texture.

Beautifying the Grounds

In planning playgrounds for children the element of beauty is too often overlooked. It is quite feasible to have trees and flowers which will add to the beauty of the grounds and have educational and esthetic values for the children.

If, for example, the entrance to the ground is the beginning of a path, a few barberries will help keep

the children in the path and will put at the threshold of the playground a little splash of color, which, with berry and leaf, will be beautiful all the year round. Instead of posts, it will be possible to have pyramidal arbor-vitæ on either side of the entrances, or morning-glories can climb a fine-wire netting and so form an arch of beauty inviting entrance to the ground.

The boundaries of the plot do not need to be bare wall or fence. As has been suggested, in some instances a hedge in mixed shrub planting can take the place of a fence. Disagreeable boundaries, such as old sheds, may be screened by planting; and a bare wall can be quickly clothed with Boston Ivy *(Ampelopsis tricuspidata)*.

Close against the buildings there might be space for some bright flowers—possibly a little band of formal gardening could be arranged there. It is not necessary, however, to be dependent for flowers upon the annuals or perennials of the formal garden. Among the shrubs there may be lilacs, bridal wreath, deutzia, dogwood, rhododendrons and azalias, if they will grow, and roses, sumac and hawthorn. Window-boxes may well be provided in connection with the buildings.

Shade

On the grounds there should be some trees to add beauty and shade. Shade should be provided most amply for the little children and for the older girls who are unable to endure the direct rays of the

sun as the boys can. Where there is a wading-pool there may be a pergola on one side or end, making a shady place where mothers can sit. Boys and girls will never seek the hottest, sunniest place in town to play, and the shade of trees will add greatly to the attractiveness as well as the beauty of the playground.

CHAPTER II

The Laying Out of the Individual Playground

BEFORE discussing the problem of laying out and suitably equipping the various divisions of the individual playground, the fact should be emphasized that the most important element of the equipment is a good play-leader. An active, enthusiastic leader can make a playground without equipment many times as attractive as one having costly equipment and a poor leader or no leader at all. Space, cost and suitability are the factors which must be considered in choosing apparatus. It is not necessary, however, to buy all the apparatus at once. It is far better to provide a good leader and a minimum equipment of game supplies at the outset and then add apparatus from season to season.*

The relative importance of the various pieces of equipment is a matter which has been much discussed. One authority suggests the following order in providing equipment for a playground: 1) Wad-

*The community athletic kits which are available at reasonable cost from the A. J. Reach Co., Philadelphia, Pa., and also from A. G. Spalding and Bros., Chicopee, Mass., may be of interest in this connection. These kits contain balls, bats, nets and other game equipment, packed in a small box which may be easily carried from place to place.

ing-pool and sand court; 2) Traveling rings for both boys and girls, and for boys a teeter ladder, climbing poles, sliding poles, horizontal bar, horizontal ladder, flying rings; 3) giant strides; 4) swings; 5) teeters; 6) slide. Another authority has suggested that in the development of a playground, swings, teeters and a sand-box be supplied the first year, adding the wading-pool, shelter-house and drinking fountains, if possible; for the second year, he suggests slides and giant strides and the wading-pool, shelter-house and drinking fountains, if they have not been previously provided; and for the third year's purchase he recommends the outdoor gymnasium. Suggested plans for laying out playgrounds may be found in the appendix.

The Three-Part Division

The best division of playgrounds is felt to be the so-called three-part division—one part for boys and girls under ten years of age, one for boys over ten, and one for girls over ten. A row of good shade trees between the children's and the girls' playground is suggested as a suitable line of demarcation between the two sections. It is possible to provide play spaces on a basis of attendance records, activities and ages. As a general rule boys require a greater amount of space than either little children or girls because of their activities. Small children should, in all probability, be considered next, as they are likely to come to the playground in greater numbers than the older girls. A good arrangement,

some authorities think, is to give one-half of the area to the boys and the other half to the older girls and small children, dividing the area between the small children and girls according to attendance records and the development of activities among the older girls.

The Small Children's Playground

The play space for small children should be in some secluded corner, out of the way of stray balls, where the children will not be disturbed by the older ones. Equipment for a small children's playground generally consists of sand-boxes, swings, including hammock or chair-swings for the youngest children, slides, seesaws and a wading-pool. It is best to have the sandboxes in the shade under or around a tree or alongside a building. Pails, with eyes for handles set below the rim, and flat-handled, galvanized-iron spoons, to be used as shovels, are valuable additions to the sandbox. Blocks are often provided in connection with the sand play.

Oftentimes a circular wading-pool is surrounded by a sand court and covered with a pergola extending on the *southern* semi-circle. By this means, every part of the sand court is exposed to sunlight at some hour of the day. Seats should be provided under the pergola for mothers. When there are trees affording sufficient shade the pergola may be discarded in favor of a pool located where the trees shade the sand court. If there are no trees, shelters and rolling canvas awnings should be directly over

the sand piles and equipment for quiet games. A separate arbor of vines in the form of a playhouse and quiet hour spot is suggested as a valuable addition to the other equipment. Kudsu is probably the most rapidly-growing vine, though Virginia creeper grows very rapidly and is hardy nearly everywhere.

Swings are usually placed in a secluded corner, which is sometimes fenced off, thus avoiding the danger of children being hit while playing games.

Playground for Larger Girls

This area should be totally enclosed with shrubbery so that the girls may feel perfectly secure from any sort of intrusion.

The usual apparatus selected for the larger girls' area consists of swings, see-saws, slides, giant strides and traveling-rings. Some authorities add to the above climbing-poles, horizontal bars and ladder, flying-rings, jumping-standards and a vaulting-horse. Such apparatus is helpful in muscle-building, but should be used under the direction of a competent instructor. In addition to whatever other apparatus is provided, an ample supply of balls, bats, nets, goals, quoits, ring-toss and other similar apparatus for games and plays should be supplied.

All heavy apparatus should be arranged along the border, leaving the center for group and team games, folk-dancing and similar activities. If the apparatus is placed about ten feet from the edge of the lot, there will be room for a grass border and for a few benches. Swings should be placed far

enough away from the fence so that the children will not strike it when swinging. The corner is one of the best places for the giant stride, as it is then out of the way and no space is wasted.

One authority suggests providing a wooden platform for dancing and games. It should occasionally be treated with raw linseed oil applied hot. A graphophone for teaching folk dancing is also a desirable asset.

The only equipment which is absolutely necessary for the game of *handball* is a fairly high wall and a ball. The side of a building will do for the wall. Oftentimes a flooring of white pine, well supported by beams closely laid, is provided. This game is suitable for either boys or girls and has increased greatly in popularity during recent years. A volley ball court should be laid out on the girls' playground. Although there is some discussion as to the value of the game of basketball for girls, where there is adequate supervision it is generally felt that a basketball court should also be provided. The long dimensions of such courts should run north and south.

The volley ball court should be outlined by distinct lines at least two inches wide. The maximum dimensions are sixty feet by thirty feet. A smaller court is permissible and desirable for young players. Side and end lines must be three feet from any obstruction. A net two feet wide is stretched taut across the center with the upper edge seven and one-half or eight feet from the ground. Special fixtures

for holding the net and combination volley ball and tennis posts and space have worked well in some cases.

The line game of basketball is not as strenuous as the regular game and therefore is more suitable for girls.

The basketball (line game) court is 100 feet by sixty feet. At a third of the distance from each end is drawn a field line parallel to the end lines, thus forming the home, center and guard sections. If the court is less than 2,500 square feet in area it may be divided in two equal sections. A goal is placed in the center of each end line. This consists of an iron ring eighteen inches in diameter, to which is hung a net, open at the bottom, the rim being ten feet above the ground. If the basket is not placed on a wall or building, there should be a backstop six feet wide and four feet high extending three feet above the basket with the rim of the basket six inches in front of the backstop. The free throw line is drawn fifteen feet in front of each goal parallel to the end line. The free throw lane is six feet wide and is formed by lines starting from the end line three feet on each side of its center and extending twelve feet toward the center of the court. At the inner ends they intersect the arc of a circle with a six-foot radius, the center of which is the center of the free throw line. The center circle is drawn with a one-foot radius in the exact center of the field.

Playground for the Larger Boys

The usual apparatus selected for the boys' area is much like that for the larger girls, consisting of slides, swings, see-saws, giant strides and traveling rings, and such apparatus for games and plays as balls, bats, nets, goals and quoits. Besides these, many authorities recommend the outdoor gymnasium, with flying-rings, climbing-ropes and poles, slanting and vertical ladders and horizontal bars, and also apparatus to supply the boys' athletic needs, such as vaulting standards and poles, high-jump standards and crossbars, shot-put rings and hurdles to be used upon the running track. Space and money will, of course, determine somewhat the amount of such equipment which can be provided.

Above all, ample room should be left for group and team games. The arrangement of apparatus around the border suggested for the girls' area applies equally well to the boys', leaving room for such games in the center. Usually there is sufficient space for laying out volleyball and basketball courts. The regular basketball court is much like that for the line game described above. The ideal size court for this game is smaller, however, measuring seventy feet by fifty feet. Sixty feet by thirty-five feet constitutes the minimum size. Many playgrounds are not large enough to allow for a regulation baseball field, but if only younger boys are to use it, a diamond with sixty-foot base-lines may be laid out. A soft ball should be used for this game, instead of the regular hard baseball, and in no case

should activities be carried on in line with a batted ball. If, because of lack of space, it is necessary to play basketball or volleyball on the baseball diamond, removable posts should be used. In this case fixed sockets with some system of caps should be built in flush with the ground to hold the posts upright.

If possible, it is well to provide a jumping-pit and a straightaway running-path, fifty to 100 yards in length, for the boys' area.

In some cases it is possible to lay out an athletic field adjacent to the playground, providing a regulation baseball diamond, circular running-track, tennis courts and other athletic facilities. Suggestions for laying out such fields are given in Chapter V.

Toilets

Unless the playground is immediately adjacent to a school or other buildings with available toilet facilities, toilet-rooms should be provided. These should be well ventilated and of perfectly sanitary construction and equipment.

Drinking Water

Drinking water should be supplied by means of sanitary drinking fountains.

Shelter Buildings

Shelter buildings of pavilion-like nature, capable of holding many people in time of sudden rain-

storms, are most desirable. These buildings may contain offices and storerooms, lockers, toilets and shower-baths and oftentimes an indoor game-room. The office should be so arranged that a director whose duties call him to the office may still keep an eye on the playground. Buildings are most advantageously placed on the dividing line between the boys' and girls' sections or in the corner of the ground, thus leaving the maximum amount of space for games.

Accessories

The playground should be provided with a flagpole which will fly not only the American flag but also a distinct playground flag. Bulletin-boards should be placed at the entrance of all play spaces, upon which may be placed rules and announcements. A first-aid equipment should be accessible at all times. A repair kit will be found of value for mending balls. In some cases the balls and equipment are mended through the organized effort of the children attending the playground. In large areas water-taps should be placed at regular intervals, so that a hose may be attached for sprinkling all parts of the playground in dry weather.

Lighting

To secure its maximum use, the playground should be well lighted at night. Electric light wires should be carried underground, as those carried overhead interfere with activities and are more dangerous.

CHAPTER III

Discussion of Common Types of Playground Apparatus and Suggestions for Their Use

THE following material, which brings together the opinions of many men experienced in playground work, in regard to the selection, care and use of various pieces of apparatus, will be helpful to committees and Boards which contemplate the laying out and equipping of playgrounds:

The Sand-Bin

The sand bin, sand box or sand garden, as it is sometimes called, is of primary importance for the small children's playground. Good dimensions for this bin are twelve by sixteen or twenty feet, with the sand bed eighteen inches deep, enclosed on four sides by either cement or plank walls twelve to fourteen inches high. It is sometimes made collapsible with malleable-iron side and corner fittings. The sand should not be placed upon a clay surface, but upon some porous surface, so that water may seep through. Excavation made to a three-foot level and filled in with loose cinders will provide drainage when the sand is watered. If it is enclosed in a

cement court with a cement bottom, a drainage system should be supplied. Wherever possible beach sand should be used, and every effort should be made to keep it in, not only a sanitary condition, but a condition which invites sand play and modeling. It should be raked thoroughly every day, turned over and exposed to the sun and air, washed with water and kept moist, so that it will pack readily. Sprinkling with a thin solution of bichloride of mercury will insure against fleas. The sand should be changed at least twice a season. Where used by large numbers of children it should be changed as often as once a month. The old sand can usually be used to advantage under the apparatus and in filling in the jumping-pit. It is suggested by one authority that there be two sets of sand bins used alternately by the week. When one set is in use the other may be purified. If possible, it is well to have, besides the large sand pile, a number of smaller ones, say five feet by five feet, which can be given to individual children by the week, day or hour. One sand pile should be kept dry for the very small children who like to bury themselves in the warm, dry sand. There may well be a wide board or plank running around the top for use as a seat and for moulding the sand.

The Wading-Pool

Wading-pools may be made by excavating a specified area, constructing a cement basin and placing at the lowest point a drain that may be opened and

closed at will. At the same point bring in a supply water pipe, letting the same extend a little higher than the grade line of the playground. A sand trap is necessary to prevent the clogging of drain pipes. Such pools are usually circular in form, about forty or fifty feet across with water five inches deep at the edge and eighteen inches deep in the centre. The thickness of the concrete walls will depend somewhat on the climate. Southern pools need no more than four inches; northern climates demand heavier construction and reinforcement. The top of the side walls should slope outward so rain and drippings will drain away from the pool. Although considerably used the circular pool is apt to be more expensive than the straight-line shape because of the difficulty in making concrete forms. A *hexagonal* pool with three south faces developed with sand-court and pergola is suggested as having all the advantages of the semi-circle as to shade, with much lower cost of construction.

The water should be let out of the pool every few days and the empty pool permitted to bake in the sun. These pools should be used only for paddling and wading and not for swimming.

The Slide

The slide, which is now found universally on children's playgrounds, consists of three parts—the chute, the stairway and the supporting structure. It is felt that stairways are better than inclines for slides and that slides should be constructed in one

piece. A waist-high railing under which the child swings to get his position on the slide prevents accidents and forces users to the proper position at the start of their descent. Slides may be built of either maple or steel. If maple is used—and many consider it more satisfactory—it should be waxed occasionally. The maple slats should be slightly beveled at the edges and be set about one-sixteenth of an inch apart to allow rain to run off readily and to provide for the expansion of the wood when wet. Slides of steel and wood may be purchased in various sizes. The slide made of three-sixteenths inch steel is suggested as giving good service. A slide six feet high and two feet broad is large enough for the small children. A ten-foot slide may be selected for the older girls and a twelve-foot slide for the older boys. It has been said that cost, maintenance, safety, order and service argue in favor of the low and short slide in preference to the high and long one. Children should not be allowed to slide down in a standing position or to walk or crawl up the chute.

The Swing

Hammock swings are sometimes provided for babies brought to the playgrounds by their mothers. Chair swings are enjoyed by children between the ages of three and six. The older children should not be allowed to use them.

The most serviceable swings for older children are those having steel framework or a frame made of

ordinary gas pipe. Three-inch medium pipe, with three-and-one-half-inch horizontals, may be used, or two-inch uprights and two-and-one-half-inch horizontals, if extra-heavy pipe is used. The uprights should be set four feet in concrete. Frames are constructed in such a way as to have two to eight swings, according to their length.

For the small children's playground the swings probably ought not to be more than eight or ten feet high. About three and one-half feet will be required for each swing. For the older boys and girls twelve to fourteen feet is a good height. Such swings will require about four feet each.

Two precautions should be taken in building or purchasing swings. The collar about the pipe, which holds the rope or chain, should be so made that it will grip like a vise, as it has to bear the strain of the swinging. The hook that holds the chain or rope should be made of tempered steel, which is both hard and tough, in order to prevent its wearing through. The friction is often reduced considerably by having the swing work on ball-bearings. All hooks and rings should be greased once a week with axle grease.

The swings may be suspended by rope or steel chain. If of rope, and many feel this to be better than the chain, hemp will be found more practicable than manila, which must be shrunk before using. Russian boat rope is very serviceable, but difficult to secure at present. The steel chain generally chosen is that with links about a foot long. Swings

with ball-bearings and steel links may be chained to the uprights. Rope swings are usually hung on hooks and taken in at night.

The swing board should be as light and soft as possible and only a little longer than the width of the child. Hard maple or soft pine may be used. A board seat, without projecting bolts and nuts, with the edge, front and back covered with rubber hose (screwed on), will reduce accidents to a minimum. The approved method of attaching the board to the rope or chain is to have a clamp go around it, terminating with a stirrup strap and eyelet of steel in which the rope or chain is fastened.

To prevent holes made by the children's feet underneath the swings a board or cement floor about three feet wide is sometimes constructed. Wood-block construction has also been used for this purpose with good results. To avoid accidents, two children should not be allowed to occupy one swing-seat. Pushing and running under the swing and pushing by holding on to the feet of those who are swinging should be prohibited.

The See-Saw

Everyone is familiar with the see-saw as a piece of play apparatus. The longer the see-saw board and the lower the standard the safer it is. See-saws are often constructed with safety bumpers, which keep the lower end six or eight inches off the ground and help to prevent any squeezing or pinching of limbs. It is best to use the see-saws with handles

so that the children may have something to hold on to. It is suggested that by making one's own see-saw boards, freight may be saved and a reserve replacement supply kept. A clause may be included in the specifications sent to manufacturers for bids, providing that only necessary hardware and fittings be provided, with blue-prints, specifying type of board to be used. Children should not be allowed to stand on the end of the see-saw or to work it alone from the middle.

The Giant Stride

The giant stride consists of a tall pole, its total length being from fourteen to twenty feet. It is usually made of steel pipe about five inches in diameter and set about four or five feet in concrete. The head is set on the top of this pipe with ball-bearings, and attached to this revolving head are six rope or chain ladders which have three or four short rungs. The rope ladder is more pleasant to hold on to, but the steel ladder lasts longer. If steel ladders are used, filling the upright pipe with material to deaden the sound of the chain knocking against it is a great improvement. The most common method of locking the stride is to chain the ladders to the post. Children should not be allowed to push anyone around, take a twist or tie the ropes together. They should be taught, also, to dodge out of the way as soon as they drop off the stride to prevent their being hit.

Athletic Equipment

A hard baseball cannot be used on an ordinary playground where other games must necessarily be carried on at the same time. The handball, volleyball, indoor baseball and the outer-seam soccer ball are probably the only types of balls necessary for the games generally played on the playground. The soccer ball may be used for basketball, football, dodgeball and captainball.

For prolonging the life of certain types of athletic equipment the following suggestions are given:

Inflated Balls—Find the spot where the ball has been sealed, which is usually a hard piece of rubber on the inside and can be found by pinching the ball. By inserting a hypodermic needle into the end of an air bulb and forcing the needle through this rubber, which the manufacturer has used to seal the ball, enough air can be forced into the ball to make it better than new. After removing the needle, pinch the rubber seal together, which again seals the hole made by the needle. In this way balls may be made to serve until the rubber cracks or splits. Rubber balls may be treated in this manner.

Basketballs, Soccerballs and Volleyballs—When a new basketball, soccerball or volleyball begins to rip in the seams have a harness-man handsew the entire ball. Use waxed linen cords for this. It may be done with either the outside or inner seam ball. After a ball gives way at one point it is not long before it gives way at another, and in the end more

is spent than it costs to have it all handsewed when the first rip appears. The length of life of such balls can be considerably prolonged by treating the cover with Neatsfoot oil before putting in use, or whenever the leather shows signs of chafing or drying out. One authority gives the following suggestions for lacing balls:

Ball Laces—Many leather laces are ruined because they are not properly laced into the ball when new. Never tie knots in a leather lace. Before inserting the lace into the ball cut a slit in the wide end of the lace just long enough to pass the other end through. Lace through the end hole, so that this slit comes underneath the flap. Then pass the needle end of the lace through this slit and pull tight. This method insures a proper start for lacing the ball, and also will never pull out as a knot will, and cannot slip through the eyelet. Such a lace can easily be removed at will. Round shoelaces answer as a lace for canvas basketballs and volleyballs. Belt-lacings split into the proper widths and lengths are the best for basketballs and soccer footballs.

Jump-Ropes—The life of a jump-rope can be prolonged by winding the center or part that touches the ground with tire tape. This also makes the rope turn easier, as it adds weight to the center.

Hockey-Sticks—Sticks can be made to last a good deal longer by winding the neck with tire tape. Splintering reduces the length of life of the stick.

Indoor Baseball Bats—In some cases, where the throwing of a bat after having hit the ball is not only dangerous but noisy, it has been found practical to turn down the ends of the bat so that a large size rubber crutch tip can be forced on. This prevents the bat from slipping out of the hand. The handle of the bat should be covered with tire tape.

Contracts for Purchasing Apparatus

In securing quotations from manufacturers, bid forms are of value. A suggested form is given in the appendix.

It is best to always make use of a carefully prepared contract in purchasing apparatus. This should contain the following items:

1. When and where delivery shall be made and who is to pay for same.

2. The erection and connecting of all parts of the apparatus after it has been delivered.

3. If cement is used as a foundation or anchorage for apparatus, let the contract state who is to be responsible for the excavation and cement work.

4. Insert a clause to cover extra or incidental expenses.

5. Do not fail to include a clause that will safeguard you or your community against troubles with labor unions.

6. Let there be a clause of guaranty on the part of the manufacturer against defective material, faulty construction and workmanship. Make this guaranty cover a period of at least three years.

A list of manufacturers of playground apparatus, athletic equipment and supplies may be secured from the Playground and Recreation Association of America, 1 Madison avenue, New York City.

Organizing Volunteers

It is suggested that however elaborate the equipment, or ample the funds, all playground apparatus should be installed with an instructor on the job, enlisting local boys in helping in its placement and the labor of getting it into condition for use. This voluntary service offers opportunity for the instructor to get acquainted, and gives the boys a sense of proprietary interest in the result. It short-cuts the long and tedious development of a sense of ownership, and of belonging, by weeks and probably months of painstaking effort.

It is well, also, to co-operate closely with the manual training classes of local high schools, enlisting them in the making of benches, wands, dumbbells and wooden blocks for the small children's use. These possibilities have been too largely overlooked, due more to oversight than intention.

CHAPTER IV

Home Made Apparatus

BECAUSE of the great use to which it is put in large cities and the pains which must be taken for safety and freedom from vulnerable points for lawsuits, playground apparatus is usually purchased under contract from manufacturers. In small towns or rural districts, however, it is often made on the ground by a local carpenter. Sometimes the children in schools or other institutions having a manual-training department construct the equipment for their own playground as a part of their work.

In the construction of all apparatus, however, special attention must be given to the friction points and all such apparatus as swings, flying-rings and traveling- rings should have special bearings at these points. Those building their own apparatus may be interested to know that the Narragansett Machine Co. manufacturers a "rocker-bearing" the A. G. Spalding and Bros. a ball-bearing device and W. S. Tothill a bearing of hard maple revolving or sliding over an iron rod, all of which give good service.

Baby or Chair-Swings

The following suggestions are given by one playground authority for constructing baby or chair-swings: Make two long saw-horses about six and one-half or seven feet high, underneath measurement, with a wide spread at the base. Hang five chair-swings on each horse. Each swing is a foot square and one and one-half feet from the next swing. Then put two horses side by side just far enough apart so that when opposite swings are flying they cannot touch one another. Run cross-pieces over the tops of these saw-horses and cover with canvas or cheap unbleached muslin. Of course, have this roof project a little beyond the saw-horses to keep the sun from striking under. Sash-cord is strong enough for the ropes. Hooks that screw in answer for the top, with horse-rings to hang the ropes to. Four pieces, one foot by one inch by two inches, form the railings, which are hung on ropes the right height above the one-foot-square seat. The whole thing is too small for big people to get into, and is easily taken in at night without a ladder. It is so cheap that you can have twenty or thirty, and they can be easily covered with canvas. The sides of the saw-horses also project so that it often warns careless little people, coming from the sides, against running in front of the swings.

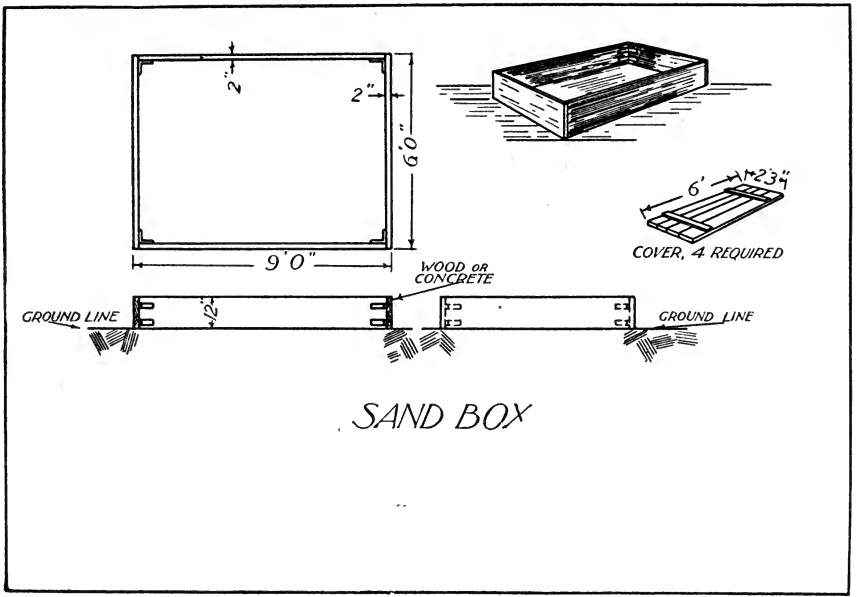
The specifications and plans given below for the construction of various types of home-made apparatus were prepared by Community Service (Incorporated), 315 Fourth avenue, New York City.

The Sand Box (See page 37 for diagram)

To build a sand box, dig a place nine feet long and six feet wide for the underlying bed of cinders three feet deep. Get four boards, each a foot high and two inches thick to make the bin, and fasten them together at the corners with angle irons from the hardware store. Next, make a cover —in one piece, or, if sliding it off and on seems too laborious, in four. To provide a four-piece cover, make each section six feet long and two feet three inches wide, with cross boards two feet three inches long by half an inch thick and three inches wide for each end so that the sections will fit the box firmly. This much accomplished, nail a wide board around the top of the box or at one end, to be used as a seat or a counter. Then put in the cinders and the sand. With the cinders underneath to provide drainage, you can wash the sand as frequently as you choose. The same drainage removes dampness after rain. The sand must not get too dry, far down, or it is useless for play. Always keep it somewhat damp down below. And if fleas appear, souse it with a weak solution of bichloride of mercury.

SAND BOX

No. of Pieces	Length	Width	Thickness	Material
2	9′	12″	2″	Wood
2	6′	12″	2″	Wood
4	6′	2′ 3″	¾″	Sections of wood
8	2′ 3″	3″	½″	Wood
8	5″	1″	¼″	Iron braces


2"
2"
6'0"
9'0"
6'
2'3"
COVER, 4 REQUIRED
WOOD OR CONCRETE
GROUND LINE
12"
GROUND LINE

SAND BOX

The Swing and Climbing Rope (See page 40 for diagram)

Dig two holes four feet deep and four feet apart from center to center. Take two pieces of wrought iron pipe, sixteen feet long and three inches in diameter, and set them upright in the holes, with care to leave a space of four feet—no more, no less—between them. Then fasten a cross-bar of wrought iron pipe to the upright—to be specific, a cross-bar six feet long and three inches in diameter, which you make secure to the uprights with pipe-fittings or with a special tee and elbow fitted with set screws furnished by a manufacturer of playground apparatus. Measuring accurately, fasten to the cross-bar a pair of strong, tempered steel hooks, thirty inches apart and equidistant from the uprights, to hold the swing. Mix a shovelful of cement with two shovelfuls of sand and four shovelfuls of gravel, and enough water to make a thin mixture. Pour it into the holes to solidify completely in forty-eight hours, at the end of which time attach the rope and seat. To make the seat, take a board two feet long, eight inches wide and an inch and a half thick, and on its under side nail at each end (by way of guarding against cracking or warping) a piece of wood eight inches long, five inches wide, and an inch thick. At each end of the seat, bore a hole through the two thicknesses of wood, and through the holes slip a rope an inch in diameter. At the ends of the rope splice tempered steel rings, and fasten to the cross-bar by iron hooks. Provide length of rope of about twenty-one feet after splicing.

If you prefer the underground braces shown in the diagram printed herewith rather than the concrete bed, secure six pieces of wood, three for each brace, each piece of wood

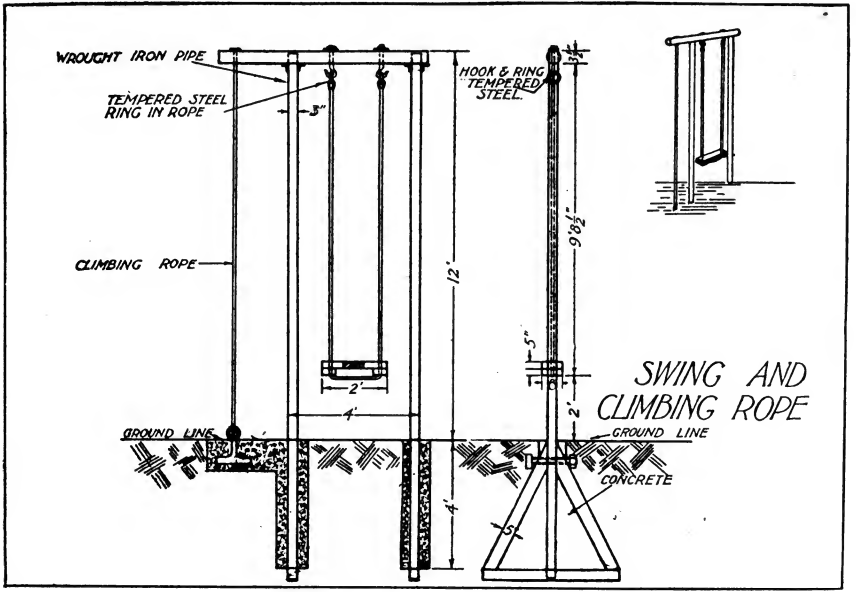
measuring four and a half feet long by five inches wide and five inches thick. With these pieces of wood, make a pair of triangles and put the pipe up the middle of each triangle through its apex. A carriage bolt fifteen inches long and half an inch through will hold the pipe firm at the top. Also make it firm at the bottom. Pack down the earth firmly around the pipes and braces.

If you would like to add a climbing rope, bore a hole at the projecting end of the cross-bar and insert an eye-bolt, and into the eye-bolt splice a rope thirteen feet long and an inch and half thick. It may hang loose, knotted at the bottom, or, if you like, you can fasten it to an iron ring set in concrete.

SWING AND CLIMBING ROPE

No. of Pieces	Length	Width	Thick-ness	Material
2	16′	3″	Diameter	Wrought iron pipe
1	6′6″	3″	Diameter	Wrought iron pipe
1	2′	8″	1¼″	Wood
2	8″	5″	1¼″	Wood
6	4′6″	5″	5″	Wood
1	23″	1″	Diameter	Rope
1	12″	1¼″	Diameter	Rope

2 iron collars with eight screws — 1 eye bolt
1 carriage bolt 15″ long, ½″ diameter — 2 steel hooks
1 iron ring attached to iron base — 2 steel rings

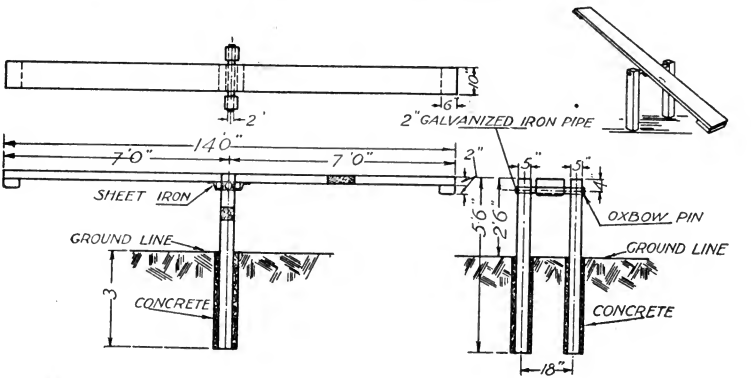

WROUGHT IRON PIPE
TEMPERED STEEL RING IN ROPE
3"
HOOK & RING TEMPERED STEEL
CLIMBING ROPE
12'
9'8½"
5"
2'
4'
2'
GROUND LINE
GROUND LINE
CONCRETE
4'
5'
SWING AND CLIMBING ROPE

The Teeter Board (See page 42 for diagram)

In making a teeter-board, think first of the foundations. After digging two holes, three feet deep and about ten inches square and a foot and a half apart from center to center, make ready a preparation of cement by taking a shovelful of Portland cement, two shovelfuls of sand, and four shovelfuls of gravel, and mix with water. Pour a little of the mixture into the holes. Then in each hole plant a wooden upright five inches square and five and a half feet tall, with two-inch holes bored through it four inches from the top. A lot depends on the care with which the wooden uprights are put in place. They must be exactly plumb, and the two-inch holes bored through them near the top must exactly face each other, as through those two-inch holes a galvanized pipe is to go. More specifically a pipe two feet and two inches long and two inches thick, with a hole bored near each end. Again to be specific, a hole three-eighths of an inch across and bored where it will leave a spare inch of pipe beyond it. Pass an ox-bow pin through each of these holes in the pipe to keep it firmly in place. Pour in the cement to make a solid mass around the foot of each upright. The next problem is the teeter board itself. The board must be fourteen feet long, ten inches wide, and two inches thick. On its underside and at each end, nail a shock-absorber—a piece of wood six inches wide and of the same thickness as the board, and having a length equal to the board's width. Provide a pair of cross-pieces—strips of wood ten inches long and two inches square—for the underside of the board near its middle. Nail them on, each placed an inch and a quarter from the exact middle of the board. When the concrete has hardened completely, put the board into position on the galvanized pipe. The cross-pieces, with a gap of two and a half inches between them let the pipe through to a nicety. If the board is not to be taken indoors at nightfall, screw a piece of sheet iron a foot and a half long, ten inches wide and an eighth of an inch thick into the under side of board across the pipe and cross-pieces. This will effectually prevent slipping.

TEETER BOARD

No. of Pieces	Length	Width	Thick-ness	Material
1	14′	10″	2″	Wood
2	5′ 6″	5″	5″	Wood
2	10″	6″	2″	Wood
2	10″	2″	2″	Wood
1	2′ 2″	2″	Diameter	Gal. iron pipe
1	18″	10″	⅛″	Sheet iron
2 Ox-bow pins				



TEETER BOARD

The Slide (See page 45 for diagram)

Select four pieces of wood, each five feet and seven inches long, six inches wide and four inches thick, to use as supports at the high end of the slide. Fit two of the four pieces together firmly at the top, placing their lower ends four feet apart so as to form a triangle with the ground as the base. With the other two pieces do the same. Next, provide for each triangle a rung two feet and seven inches long by three inches wide and an inch thick, and nail it on about fourteen inches above the ground. When finished set the braces parallel to each other a foot and ten inches apart. Across the top—from the tip of one triangle to the tip of its mate—nail a hard-wood board two inches wide and an inch thick. Now for the front supports. Both are to be triangular. Choose for each of them a board sixteen inches long by three inches wide and an inch thick and then two additional boards twelve inches long by three inches wide and an inch thick. With these make a pair of right triangles, set parallel to each other a foot and ten inches apart, with the right angles toward the front or low end, and so placed as to leave a space of seven feet and a half between the front of the back braces and the back of the front braces.

For the chute itself get seven maple boards, the hardest obtainable, measuring eleven and a half feet long by three inches broad and half an inch thick. Prepare them carefully, with special attention to the grain, which must run down. In fastening them on—placed lengthwise, and leaving cracks a sixteenth of an inch wide—use dowel pins. On the bottom, a few inches from the end, screw a cleat a foot and ten inches long by two inches wide and an inch thick. Two additional cleats of the same dimensions are needed; one goes on at the lower end, the other halfway up the slide.

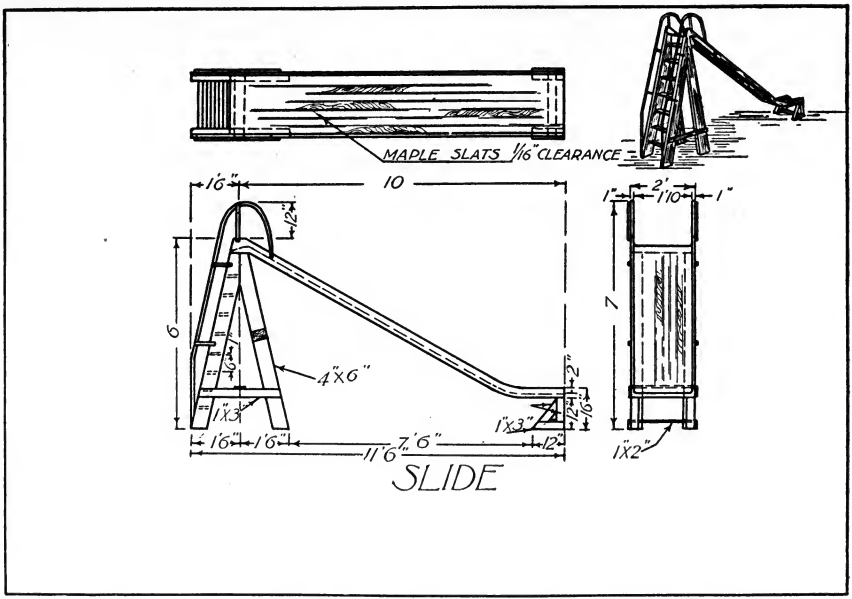
Now bend back the top of the slide a little, a short way from the end, so that it will fit over the cross piece which

connects the braces. In order to bend the maple easily, either steam it or saw the wood half through underneath the part to be bent. Then fasten it firmly with screws. Also bend back the slide at the bottom, about two feet and five inches from the end, so that the cleat will rest across the top of the small braces, and make it fast with screws. Build the sides of the slide out of boards eleven and a half feet long, four inches wide and an inch thick, bending or fashioning them at both top and bottom to suit the bend in the slide, and nailing them to the top and bottom braces. Round them carefully where the children's hands rub along.

Finally, provide for the steps and handrail up the back of the top brace, making eight wooden steps at intervals of six inches and measuring a foot and ten inches long by six inches wide and an inch thick, while the handrail consists of a galvanized iron pipe, nine feet tall and an inch and a quarter thick, bent into the proper shape and attached with short braces as the diagram shows.

SLIDE

No. of Pieces	Length	Width	Thick-ness	Material
4	5′ 7″	6″	4″	Wood
2	2′ 7″	3″	1″	Wood
2	2′ 1″	3″	1″	Wood
4	12″	3″	1″	Wood
2	16″	3″	1″	Wood
4	1′ 10″	2″	1″	Wood
7	11′ 6″	3″	½″	Wood
2	9′	1¼″	Diameter	Gal. iron pipe
8	1′ 10″	6″	1″	Wood


MAPLE SLATS 1/16" CLEARANCE
16"
10
12"
6
4"X6"
1"X3"
1'6"
1'6"
7'6"
11'6"
12"
2"
1"X3"
1"
2'
1'10"
1"
7
1"X2"

SLIDE

The Horizontal Bar (See page 47 for diagram)

Provide yourself with a galvanized iron pipe six feet long and an inch and a quarter thick. Also, provide two posts—of strong wood—ten feet tall by four inches square. At points two inches from each end of the galvanized iron bar, drill holes five-eighths of an inch across. Then, six inches below the top of each post, bore a hole an inch and a quarter across. After that has been accomplished, bore a new hole intersecting this at right angles (the two holes must cross in the center without unevenness) and measuring a half-inch in diameter.

After making sure that the bar and posts comply with the regulations, dig two pits, three feet deep and about ten inches square and far enough apart so that the space between posts will measure exactly five feet and four inches.

Into these pits spill six inches of concrete, made by taking a shovelful of Portland cement, two shovelfuls of sand, and four shovelfuls of gravel, and mixing with water. Then, set the posts upright in the pits, careful to have them the stipulated five feet and four inches apart and to have the large holes near their tops exactly facing each other and—still more important, if anything—to have these large holes at exactly the same height from the level ground, as otherwise the bar will not be horizontal.

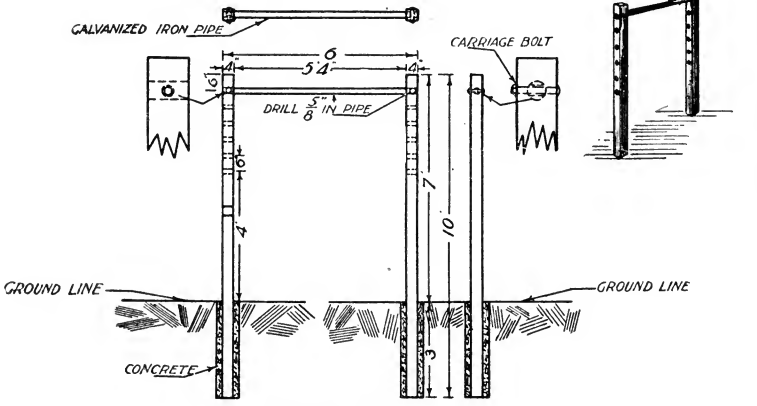
Now slip the bar through the two large holes. As soon as it is in place, secure it by poking carriage bolts through the small holes in the posts. A carriage bolt four and a half inches long and half an inch thick is the right size. The bolts not only go through the posts, but also through the bar itself. Pour in the concrete to fill the space around the posts. Give the concrete two full days to harden.

If you prefer use bricks and stones at top and bottom of the pits to brace the posts, instead of concrete, only, in that case you must stamp the ground down firmly around them.

After the posts and bar are securely set, you can improve on perfection by drilling additional holes in the posts, at intervals of six inches, to within four feet of the ground. That makes the bar adjustable to various heights, so that the smaller small boys can perform on it and the big ones vault it.

HORIZONTAL BAR

No. of Pieces	Length	Width	Thickness	Material
2	10′	4″	4″	Wood
1	6′	1¼″	Outside Diameter	Gal. iron pipe
2	4½″	½″	Diameter	Carriage bolts



HORIZONTAL BAR

The specifications given below for making a giant stride were published in a rural recreation manual, "Neighborhood Play" published by The Youth's Companion in co-operation with the United States Bureau of Education.

Giant Stride

The basis for a cheaply and easily constructed giant stride is an old wagon wheel and a pole eighteen feet long and five inches in diameter at the small end. In almost any village the wheel can be had for the asking, and the pole probably can be cut in the woods.

If you use a wheel with a wooden axle stub, remove the axle from the skein, which is the "tapering metal sleeve surrounding a wooden axle spindle to protect it from wear." Shape the top of the pole to fit into the axle skein, and fasten the skein securely in place.

If you use a wheel with a metal axle, cut off the axle about a foot from the hub, and sharpen it to a point. Here is where you may have to call upon the blacksmith. Cut off the spokes four inches from the hub. Into the middle of the small end of the pole bore a two-inch hole about six inches deep, and drive the axle into it. If the blacksmith is helping you, have him shrink an iron collar on the end of the pole, to keep it from splitting. It is well to use an all-metal wheel and axle.

Cut sixty feet of one-inch Manila rope into four equal pieces. With copper wire, or by splicing, attach the ropes to the hub. Knot them at the bottom, and about every two feet for the lower eight feet. After it has been hung in the sun and rain until it has stretched as much as it will, apply a thin solution of pine tar to preserve it.

Set the pole in concrete, four feet in the ground. At that height, the lower knot of the rope should clear the ground by about two feet. It is well to place a tin or other waterproof cover over the hub, if it is exposed. The entire wheel may be used, and the ropes tied to the felly; the result is a lengthened flying stride, but an increase in danger.....

Working drawings, which will be found helpful in constructing apparatus, may be found in "Playground Technique and Playcraft," a book by Arthur Leland, published by Doubleday, Page & Co., at $2.50; and in Chapter VIII of "Play and Athletics, Bulletin No. 1842," published by the University of Texas, Austin, Texas.

Other forms of apparatus which require almost no expense for construction, installation or maintenance are the jumping-pit, balancing-tree, hillock, climbing-tree and jumping-stairs described by Dr. E. H. Arnold.

Jumping-Pit

This consists of an excavation ten or more feet wide, thirty or more feet long, three or more feet deep at one of the narrow sides, running from this depth diagonally upward to the upper edge at the other narrow end. The sides of the pit are made secure by stout planks, properly prepared to withstand moisture. The ground around is well evened up. The bottom of the pit is free from stones and covered with at least six inches, if possible more, of good sand. In this pit babes may enjoy the sand play. Deep jumping from the sides at various heights into the sand is enjoyed by the smaller children. For broad-jumping, standing and running it is excellent. The first attempts at pole-vaulting may be made from the edge of this pit. With some assistance tumbling may be done from the edges into the pit.

Balancing-Tree

The balancing-tree is a large and perfectly straight tree, fifty or more feet long, freed of the bark and rounded off. It is supported by two or three wooden feet, one at the extreme thick end,

the other one sufficiently far from the thinner end to allow the thin end free play to swing. At the thicker end the tree may be two and more feet in diameter. It tapers to an end of four or six inches in diameter, which is free to swing. The tree is so supported that at its thicker end its upper edge would be three to three and one-half feet from the ground. The tree is then placed securely on its feet so that its long axle is horizontal. This tree, as its name implies, gives a chance for balancing exercises on a broad and steady and also on a more and more narrow surface, which sways and swings. It may be used for deep jumping, for vaults of all kinds. In the more solid parts of the tree holes may be drilled and pommels may be fastened on it; then we have it serve all the purposes of a horse or saddle-boom. Children may ride on it astride, may swing on the movable part, and should in that position find great enjoyment.

Hillock

The hillock consists of a small elevation on the playground, two to five feet high, from three to six feet wide at the base, tapering off toward the top, well covered with turf. Deep jumping, high jumping and hurdling may be done on and off and over this. Pole-vaulting may be taught from it. This gives opportunity for the much-enjoyed frolic, rolling of children. In winter, when it is covered with snow, it gives a fine start for the sled. It invites war games for the possession of the top of it.

Climbing-Tree

The climbing-tree is a straight tree no less than thirty feet high, made smooth, but not necessarily altogether even, securely implanted. Its top is protected by a platform sufficiently wide not to allow its edge to be grasped by the climber. While this apparatus serves climbing primarily, until the ingenuity of the child makes it the center for other games, it furthers that type of climbing which is the normal and natural one, and which can be practised only on trees and for which the gymnasium climbing-pole gives no chance at all. Two of these may be made the end-supports of the playground swings.

Jumping-Stairs

These are wooden stairs of ordinary construction, leading with ten or twelve steps to a height of from six to eight feet either to a platform, or, better, to stairs of the same type, leading down on the other side of the platform. If the sides of this are inclosed by boards and a door cut in, it may be made the receptacle for playground hand apparatus. These stairs are surrounded on all four sides with sand of at least six-inch thickness. Anyone who has ever watched the great fondness of children for jumping from stairs will know that the installation of this apparatus is only half completed before the children are beginning to make use of it for broad, high and deep jumping. It may once more be used to start

pole-vaulting. Some tumbling may be done from it. On the solid side of it targets may be painted. The sand around it gives a good place for the sand play of small children, but also for a free bout of friendly wrestling of boys.

Leaflet No. 42 issued by the Junior Red Cross, 44 East Twenty-third street, New York City, gives helpful suggestions on the construction of home-made apparatus.

CHAPTER V

The Athletic Field

General Considerations

Athletic fields, providing tennis courts, running-track, baseball and football grounds, a field-house or locker-building, and sometimes a swimming-pool, must oftentimes, because of the space necessary for their development, be placed at a distance from the regular playground. Since they are generally used by the older youths and adults, they will serve a territory of a mile or more in radius and may be located on or near main thoroughfares. Five acres constitutes the minimum area for such fields. Many will wish to make use of the field at night, and arrangements should therefore be made for lighting.

Surfacing and Orientation

Two points which must be given particular consideration in laying out ballfields, running-tracks and game courts are surfacing and orientation. The points on surfacing given in Chapter I hold generally for athletic fields, as well as playgrounds. As most games are played in the afternoon, and as the low sun is the most troublesome, it is best to run the long

dimension of the field north and south in games like football and tennis, where the playing is up and down the area of play. Opinions differ regarding the baseball field, and circumstances often make certain arrangements necessary. Probably the best arrangement, however, is that of having the line between home-plate and first-base run north and south.

Marking Courts

Boundary lines should be plainly marked. White-linen tape fastened to the ground with wooden pins is often used, but it is not now as popular a method of marking as with white-wash or wet lime. Dry marks may be made with marble dust, slaked lime or a mixture of two parts sand and one whiting. Roller-markers for making wet or dry marks may be purchased. Mr. Paul Williams suggests, in an article on the construction of tennis courts, a stencil for applying whitewash which may be made in case a marker is not available. This consists of two light boards about three feet long placed parallel to each other with an open space between them the width of the line; a handle may be put on one end for convenience. With an old broom as a brush, the lines may easily be gone over and fairly good results obtained. A sprinkling can with the spout flattened down, leaving only a small opening, is sometimes used for a tennis marker.

*The Baseball Diamond**

The regular game of baseball with a hard ball is played on a level field, preferably not less than 325 feet square, in which the "diamond," or infield, ninety feet by ninety feet, is outlined obliquely to the boundaries of the larger field. The "home-plate" is usually made of whitened rubber, five-sided, measuring twelve inches along the lines of the diamond from the angle, seventeen inches across the front and eight and one-half inches from the twelve-inch lines to the forward line. It should not be closer than ninety feet to the grandstand. The first, second and third bases measure fifteen inches by fifteen inches and run to the right from the "home-plate."

The "batter's box" consists of an oblong enclosure, six feet by four feet, drawn six inches from the "home-plate" on each side. The pitcher's plate is of whitened rubber, twenty-four inches by six inches, placed practically in the center of the diamond on a gradually sloping mound not more than fifteen inches higher than the home-plate. The catcher's place is in a triangle drawn immediately back of the home-plate by extending the lines of the diamond and connecting them with a line ten feet from the point of the plate.

A high-board or wire fence erected ninety feet back of the home-plate serves as a backstop. It

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*Description of fields taken from the "Handbook of Athletic Games," by Bancroft and Pulvermacher, published by The Macmillan Co., 64 Fifth Ave., New York City.

is suggested that time is saved in amateur games by having the backstop about thirty feet from the home plate instead of the regulation ninety feet.

The foul lines are made by continuing beyond first and third bases to the edge of the playing enclosure the lines of the diamond running forward on either side from the home-plate. The "three-foot" line is drawn parallel to the diamond from home to first base for the latter half of it and three feet from it. Coachers' lines are drawn off first and third bases toward the home-plate, fifteen feet from the outline of the diamond parallel to the four lines.

Benches for players are placed back of the batter fifty feet from the diamond.

Note: Oftentimes there is not enough space available to have a field 325 feet square. In this case a smaller diamond can be quite satisfactory. It is suggested that on city plots it is more practical to build the backstop with an over hanging wire top to prevent foul balls going out of the field into streets or buildings. A successful cage backstop is one within fifteen feet from the home-plate, made of heavy wire and overhanging the home-plate by twelve inches or more.

The Football Field

The football field consists of a rectangle, 360 feet by 160 feet, called, respectively, side lines and end lines. Ten yards inside of each end line is drawn a parallel line called the goal line, marking off the

end zone. At intervals of five yards, parallel with these lines, other lines are drawn for an aid in judging distances. All lines should be very distinct, especially the boundary lines and the end, goal and twenty and forty-yard lines.

A goal, consisting of two upright posts at least twenty feet high and placed eighteen feet six inches apart, with a horizontal crossbar ten feet from the ground, is placed in the center of each of the goal lines. For soccer, the goal posts should be twenty-four feet apart, with the crossbars eight feet from the ground.

The Hockey Field

Field hockey may be played in the football field. It needs a space 150 to 180 feet wide, 300 feet long and about a thirty-foot additional space behind the goal lines. Flags on posts four feet high are often put up to mark the corners and sides of the field. The field is divided into halves by a transverse line and each half divided by another transverse line twenty-five yards from the goal line. A cross is drawn in the center on the half-way line. The striking circle is made by drawing a line four yards long fifteen yards in front of each goal and parallel with the goal lines and connecting the end of this line to the goal line, with a quarter circle for which the goal post is the center. The goals consist of posts seven feet high, two inches broad and three inches deep placed twelve feet apart and connected by a

crossbar. Each goal is provided with a net for catching the ball.

The Running-Track

Local conditions will usually dictate the shape and size of a running-track. A track of less than a quarter of a mile is not, however, considered desirable for important games*.

The following suggestions and diagram with the accompanying key, are printed through the courtesy of the Amateur Athletic Union of the United States and A. G. Spalding & Bros.

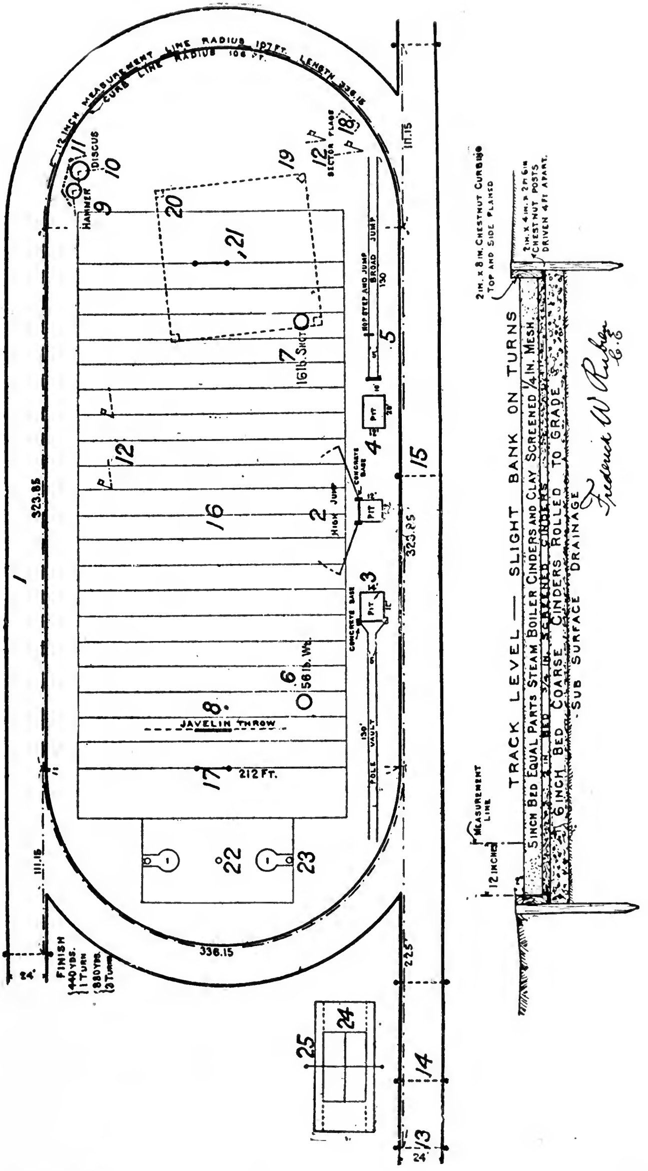
An athletic field badly designed or constructed tends to lessen interest, and as in many cases it is difficult to obtain the information locally, we present herewith a sample diagram (See page 59). The track was designed for the 1916 national championships of the Amateur Athletic Union of the United States, and is situated in Weequahic Park, Newark, N. J. The arrangement was conceded by leading athletic authorities to be ideal, and the fact that a number of new American records were established, testifies to the speed and construction of the track. The track was designed and laid out by Mr. Frederick W. Rubien of New York, Secretary of the Amateur Athletic Union of the United States. Mr. Rubien, who is a civil engineer and surveyor, has had many years experience in the construction of athletic tracks.

An athletic field can be laid out on almost any level area and while no hard and fast rule can be laid down as to the selection of a plot, nevertheless if the ground is high and dry a better result will be obtained.

It is generally conceded that a running track measuring four laps to a mile is the most popular size for outdoor

*Satisfactory dimensions for running-tracks for minimum areas are as follows:

4	laps	to	the	mile,	center	line	267.3 ft.	Radii	125 ft.
5	"	"	"	"	"	"	135.3 "	"	125 "
6	"	"	"	"	"	"	116.4 "	"	103 "
8	"	"	"	"	"	"	115.8 "	"	100 "


12 INCH MEASUREMENT LINE RADIUS 107 FT. LENGTH 336.15
CURB LINE RADIUS 106 FT.
HAMMER
DISCUS
SECTOR FLAGS
16 lb. SHOT
56 lb. Wt.
JAVELIN THROW
212 FT.
HIGH JUMP
CONCRETE BASE
PIT
HOP STEP AND JUMP
BROAD JUMP
130
POLE VAULT
323.85
111.15
336.15
22.5
24'
FINISH
440 YDS. 1 TURN
880 YDS. 3 TURNS
TRACK LEVEL — SLIGHT BANK ON TURNS
5 INCH BED EQUAL PARTS STEAM BOILER CINDERS AND CLAY SCREENED 1/4 IN. MESH
2 IN. BED 3/4 IN. SCREENED CINDERS
6 INCH BED COARSE CINDERS ROLLED TO GRADE
SUB SURFACE DRAINAGE
2 IN. x 8 IN. CHESTNUT CURBING TOP AND SIDE PLANED
2 IN. x 4 IN. x 2 FT. 6 IN. CHESTNUT POSTS DRIVEN 4 FT. APART.
MEASUREMENT LINE
12 INCHES
Frederick W Rubien C.E.

sports. In addition to the track events proper, pole vaulting and the jumps may be contested without interruption, while the field competitions—javelin, discus, shot, hammer and the heavy weight—can be carried on within sight of the spectators and with safety to contestants and officials. A very satisfactory baseball diamond can be laid out within the limits of the track, and the space is ideal for intercollegiate and soccer foot ball. Outdoor basketball is practicable, while permanent tennis courts also can be included.

The expense of construction of a running track has deterred many establishments from attempting to build one, while others have been failures from the first, owing to faulty construction. A glance at the cross section (page 59) will call attention to the inexpensive and light, springy nature of the track as against the heavy, macadam construction so often employed. An all cinder track is absolutely worthless. The cinders will not pack, they tear up easily, and it is the hardest kind of a track to keep in condition.

The infield, from curb to curb, is 212 feet wide, about 30 feet wider than the track in the famous Harvard Stadium. The turns are not as sharp as in the latter and the tangents are about 108 yards long. The entire track, which is spirit level throughout, except for the slight banking on the turns, is 24 feet wide, permitting six lanes for the sprints and five regulation width hurdles. It has a 220 yard straightaway, the 440 yards was run with one turn and the 880 yards with two turns. The main seating accommodations are along the 220 yard straightaway. The jumping pits are located directly opposite the stand and about 15 feet inside of the curb, affording the greatest number of spectators an excellent view. This arrangement is preferable to having all of these events crowded at one end of the infield. The locations of the weight events are distributed about the infield and do not interfere with each other or place the officials or spectators in jeopardy from miscalculated throws.

After a track has been built it should not be allowed to run down, constant attention being necessary to keep it up to a high standard of efficiency. It is simply money wasted to build an athletic track and then expect it to keep in condition without any further attention. A groundsman should be employed, whose duty it should be to care for the track exclusively. In dry weather it should be sprinkled every day or two and gone over daily, scraped and rolled, and all uneven surfaces brought up to a level. The best made tracks will develop these depressions and the best way to discover them is to go out on the track immediately

after a rainstorm and note where the puddles occur. Throw into each puddle a block of wood, to serve as a marker when the water has disappeared. These imperfections should have immediate attention. It is also a good plan to have several loads of the finest sieved cinders on hand, which should be worked in from time to time with the top dressing, rolled, scraped and watered.

*1—Track (quarter mile).
2—Running high jump.
3—Pole vault.
Standard; vaulting poles; take-off board.
4—Running broad jump.
Take-off board.
5—Running hop, step and jump.
6—56 lb. weight throw for distance.
Official 56 lb. brass shell filled weight; iron circle.
7—16 lb. shot put.
Official 16 lb. brass shell filled shot; iron circle; stop-board.
8—Javelin throw.
Official javelins; toe-board.
9—16 lb. hammer throw.
Official 16 lb. brass shell filled hammer; iron circle; sector flags.
10—Discus throw.
Official Olympic discus; iron circle; sector flags.
11—Protective cage, hammer and discus throws.
12—Metal sector flags for hammer throw and discus.
13—Start 220, 440, 880 yards run; 220 yards hurdle race.
Sets (three or four) of 10 combination official hurdles.
14—Start of 120 yards hurdle race.
Use same sets of hurdles as for 220 yards hurdle race, adjusting to correct height.
15—Finish 100 yards run; 120 yards hurdle race; 880 yards run; 1 mile run; 5 mile run.
Finish posts.
16—Foot ball field.
Use tennis marker for making whitewash lines.
17—Foot ball goal posts.
18—Movable base ball backstop.
19—Home plate (rubber).
20—First base.
Base bags; use tennis marker for making foul lines, etc.
21—Pitcher's plate (rubber).
22—Basket ball court.
23—Goal and backstop.
Goal nets; use tennis marker for boundary lines.
24—Single and double tennis court.
Marker for lines of court.
25—Net and posts.
Single and double nets; adjustable posts.

Accessories—Platform (movable) for judge at finish; gong to attach to finish post to announce beginning of last lap; red worsted for finish line; stakes and cord to make lanes for sprints; whistle for officials; pistol for starter; megaphone for announcer; steel tapes for measuring; rake for jumping pits. Timers provide their own stop watches. It is

*See diagram (p. 59) for numbers.

also advisable to have a bench, with smooth board in front, securely nailed, to serve as a desk for reporters. For duties of officials, and general conduct of an athletic meet, see Official Handbook of the Amateur Athletic Union of the United States (Spalding's Athletic Library No. 12A), price 10 cents.

Tennis Courts

There are various types of tennis courts, including courts of grass, asphalt, concrete and clay. A dirt court, when properly laid out and cared for, wears well and probably offers the best combination of durability, reasonable construction cost and upkeep expense. Space determines the number of courts which may be provided.

Surfacing is here a most important factor as there must be no humps or hollows if they can possibly be avoided. One authority feels that for clay courts a pitch of six inches from back line to centre is necessary to solve the drainage problem. On the tennis courts in Grand Rapids a pitch of six inches from the middle to the end has been found satisfactory. Mr. Paul Williams, in his article on tennis court construction, suggests the following as the usual best method of building a dirt court: Cut away the earth to the depth of one foot; level carefully and be sure the grade is right. Put in about six inches of broken stone, the size of the stone ranging from two inches to one inch in diameter. Pound down very hard. Put on a three-inch layer of finely broken stone or crushed gravel. Pound this down and keep well watered for several days. Be sure and keep the foundation perfectly smooth and level. Now add the top dressing which should

be from three to six inches thick. A mixture of sand and clay may be used for this. If the clay is sticky, use one part of sand to four of clay. Usually eight of clay to one of sand is the right mixture. A very soft court needs more clay; a sticky surface needs more sand. Water well and roll twice daily for two weeks before the court is used. Light raking, careful rolling and sprinkling will produce a firm surface free from hollows and humps.

Laying out the court is a simple process although it requires accuracy in measurement. A clear space sixty feet by one hundred and twenty feet is required in order to leave room for the runways at the ends and sides. The singles court is twenty-seven feet by seventy-eight feet, while the doubles court is thirty-six feet wide. The net posts should be forty-two feet apart and to mark the court it is necessary to square the lines by these posts. Drive a stake three feet inside each post, these stakes being exactly thirty-six feet apart. Lay out one side line seventy-eight feet long, passing over one stake which comes at the thirty-nine foot mark or half the length of the side line. By making the distance from each end of the seventy-eight-foot line to the opposite stake equal, the side line can be squared and the other laid out in the same manner. It is then simply a matter of measurement to put in the service and base lines. The back stops should not be set so close to the court as to cut down open space. Wire netting carried on wood or steel posts is the material generally used for backstops. Most

courts are marked with lime put on wet. Both grass and dirt courts should be rolled after being used but it is useless to do this until any inequalities in the surface have been repaired. This is particularly true with the dirt court. After it has been played upon, it should be dragged or swept, using a piece of scantling to weight down several thicknesses of burlap. This brushes out all the little irregularities and then rolling and sprinkling are in order.

Bleachers

The bleachers should be built of wood, in sections capable of being carried, so that they can be placed around the baseball field, or up and down the side lines of the football field. They should be put together with bolts so that they can be taken down and stored during the winter. The portable bleachers used on the San Diego, California, playgrounds, are put up in sections—each section holding eighty people. It is estimated that two men with a team can take twenty bleachers down and put them up again in half a day.

Field House

There are many different types of field houses varying greatly in size and cost. Some contain a library, clubrooms, game-rooms, a kitchen, restaurant, gymnasium, running-track and many other facilities. The Chicago and Seattle field-houses are noted for their beauty and usefulness. However, a field-house does not necessarily have to be large or

expensive. The facilities which it should provide are toilets, shower-baths, an office, dressing-rooms, a locker-room, and, if possible, a recreation room. A comparatively inexpensive one-story field-house built in Racine, Wisconsin, contains a gymnasium, twelve shower-baths, toilets for men and women, a reading-room, kitchen and recreation room. Space has been economized by using the recreation room as a dressing-room and having a sectional movable platform instead of a permanent stage. The locker-room contains a few steel lockers, but it is also fitted with pigeonholes in which are slipped wire baskets. This method has been found an economy of space and money.

The Playground and Recreation Association of America, 1 Madison Avenue, New York City, will be glad to furnish suggestions for the construction of such buildings, upon application.

The Swimming Pool

The swimming-pool is a playground in itself. Because of the number of points which should be discussed in considering its construction, full space cannot be given to it here. The question of size and depth will, of course, be governed by local conditions. Outdoor pools are usually of concrete and vary from seventy-five to one hundred and fifty feet long and from thirty to sixty feet wide. A long, narrow pool is preferable. The depth should not be more than four feet at the shallow end nor less than seven feet at the deeper end.

The following points must be given particular consideration in building swimming pools:

The relationship of the pool bottom and the sewer level ought to be carefully determined beforehand, so as to avoid the expense of pumps for emptying the pool.

Provision should be made for filtering and sterilizing the water.

There should be an adequate water supply and sufficiently large openings for rapid supply and escape in the pool.

A hose connection should be provided with hot and cold water for use in washing the pool.

Adequate shower-baths and bath-houses should be supplied and an office should be provided for the swimming instructor.

Helpful suggestions on the construction and care of swimming pools are given in the following pamphlets:

"Swimming Pools," by V. K. Brown and S. K. Nason, price 15c., and "Some Notes on the Construction and Administration of Swimming Pools," by Joseph E. Raycroft, price 20c. Both pamphlets are published by The Playground and Recreation Association of America, 1 Madison Avenue, New York City.

Conclusion

In closing, it may be worth while to point out the fact that a fully-equipped playground cannot be of any great use unless it is properly maintained. Ample funds should, therefore, be provided for upkeep and operation. "To spend a great deal of money for playground equipment and little for maintenance and operation is like saving at the spigot and wasting at the bunghole."